

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/B2005/002161

International filing date (day/month/year)  
06.07.2005

Priority date (day/month/year)  
31.01.2005

International Patent Classification (IPC) or both national classification and IPC  
C01B33/18

Applicant  
GCC TECHNOLOGY AND PROCESSES S.A.

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

|                               |             |      |
|-------------------------------|-------------|------|
| Novelty (N)                   | Yes: Claims | 1-18 |
|                               | No: Claims  |      |
| Inventive step (IS)           | Yes: Claims | 1-18 |
|                               | No: Claims  |      |
| Industrial applicability (IA) | Yes: Claims | 1-18 |
|                               | No: Claims  |      |

2. Citations and explanations

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1 : US 4 234 347 A (KIRILISHIN ET AL) 18 November 1980 (1980-11-18)

D2 : PATENT ABSTRACTS OF JAPAN vol. 2000, no. 16, 8 May 2001 (2001-05-08)  
&; JP 2001 003034 A (KAO CORP), 9 January 2001 (2001-01-09)

D3 : DE 39 38 730 A1 (HENKEL KGAA, 4000 DUESSELDORF, DE) 29 May 1991  
(1991-05-29)

2. Document D1 discloses a binder for a chemically resistant concrete, comprising from 30 to 80 wt.% of finely divided quartz sand, and from 20 to 70 wt.% of at least one crystalline modification of silica. Said crystalline modification of silica is a tridymite and/or cristobalite particle containing either sodium oxide or potassium oxide on its surface (claim 1). Not less than 70 wt.% of the silica modification has a particle size of between 0.315 and 1.25 mm (claim 2). Said binder is produced by mixing quartz sand together with a sodium or potassium salt, heating, cooling and grinding the mixture to form the silica modification, which is subsequently mixed with finely divided quartz (claim 9).

Document D2 discloses a silica composition having a mean particle size 0.1-22  $\mu\text{m}$ , a crystallite size of 5-200 nm, and comprising 50-100 wt.% tridymite and 0-50 wt.% cristobalite. It is produced by mixing a silicious material, having at least 95 wt.%  $\text{SiO}_2$ , with an alkaline metal or alkaline earth metal compound and firing the mixture. The composition is employed as an abrasive, no pozzolanic activity being disclosed.

Document D3 concerns the production of reactive silica phases by firing a mixture of quartz sand and an alkali metal compound (claim 1). The obtained product comprises cristobalite, tridymite, amorphous silica and alkali metal silicate, with a low quartz content (claim 2). It is not explicitly disclosed what percentage of the product consists of cristobalite and tridymite.

- 2.1 The subject-matter of independent claim 1 differs from the silica of D1 in that the silica is specified as being a microsilica, which implies that it has a maximum particle size of 100 microns.

The subject-matter of independent claim 1 differs from the silica of D2 in that the presently claimed microsilica comprises a maximum of 90 wt.% cristobalite and tridimite, whereas no maximum is disclosed in D2.

The subject-matter of independent claim 1 differs from the silica of D3 in that the prior art composition has an undisclosed total silica, cristobalite and tridimite content.

The subject-matter of claim 1 is therefore novel (Article 33(2) PCT).

The subject-matter of independent claims 12 and 16 differs from the known processes of D1-D3 in that the starting material is chosen from natural deposits having specific silica content and density before undergoing any further treatment.

The subject-matter of claims 12 and 16 is therefore novel.

- 2.2 The problem to be solved by the present invention may be regarded as how to provide a silicious pozzolanic material having a high pozzolanic index by a low energy consumption method.

The solution to this problem proposed in claims 1, 12 and 16 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The applicant has shown, by way of the examples, that the microsilica, comprising between 55 and 90 wt.% of cristobalite and tridimite, has a higher pozzolanic index than commercial microsilicas and imparts characteristics of durability to concrete cements. Furthermore, it has been shown that the microsilica of the application can be obtained when starting from natural deposits having a specific SiO<sub>2</sub> content and density.

There is no suggestion in the state of the art that a method such as that presently claimed would lead to a product having the demonstrated advantageous characteristics.

- 2.3 Claims 2-11 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step. Similarly, claims 13-15 and 17, 18, which are dependent on claims 12 and 16, respectively, also meet the requirements of the PCT with respect to novelty and inventive step.

**Re Item VIII**

**Certain observations on the international application**

1. It is clear from the description on page 10 that the particle size of the microsilica is essential to the definition of the invention as the advantageous effect will only be imparted if the microsilica can be intimately mixed with the cementitious material without needing to use high energy milling process.

Furthermore, it is seen on page 3 that the shape, fineness, particle size distribution, density and composition of pozzolan particles all influence the characteristics of the concrete into which they are mixed.

Since independent claim 1 does not contain this feature it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

To this end, it is requested that the feature of claim 8 be incorporated into independent claim 1. This will also aid to clearly differentiate the present microsilica from the composition of D1.

Moreover, it is clear from the examples that the technical effect is only achieved when the microsilica has a density of less than  $2.4 \text{ g/cm}^3$ . Thus, as this is clearly an essential feature, it is requested that claim 9 be incorporated into claim 1.

2. Claim 12 comprises all the features of claim 16 and is therefore not appropriately formulated as a claim dependent on the latter (Rule 6.4 PCT).
3. Claims 14, 15 and 18 are supposedly method claims, although the features to which they refer are product features which do not serve to further define the process steps.

It is, therefore, requested that said claims be deleted as they cannot be dependent on process claims 12 or 16.